

Customer No. 26629
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Patent
Attorney Docket No. PIL8015.011

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Wiseman, Donald H.
Serial No. : 10/707,909
Filed : January 23, 2004
For : **CRYSTAL GROWER WITH INTEGRATED LITZ COIL**
Group Art No. : 1765
Examiner : Kunemund, R.

CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10

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37 CFR 1.8(a)

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Date: February 5, 2007

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RESPONSE TO NOTICE OF NON-COMPLIANT APPEAL BRIEF
MAILED JANUARY 5, 2007

Dear Sir:

Responsive to the Notice of Non-Compliant Appeal Brief mailed January 5, 2007,
Applicant requests consideration of the Remarks set forth below:

REMARKS

In the Notification of Non-Compliant Appeal Brief mailed January 5, 2007, the Examiner stated that the Appeal Brief filed on August 15, 2005 was non-compliant because (1) the "Evidence Appendix" and "Related Proceedings Appendix" are missing, and (2) the claimed invention is not mapped to the independent claims on appeal. *See Notification of Non-Compliant Appeal Brief*, January 5, 2007. In response, Appellant has added the "Evidence Appendix" and "Related Proceedings Appendix" as required under 37 CFR 41.37(c)(1) and amended section, **5. Summary of the Claimed Subject Matter**, to include identification of all the independent claims and the summaries thereof. Please find attached an amended Appeal Brief incorporating the amendments identified above.

Respectfully submitted,

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Alexandria, VA 22313-1450

APPEAL BRIEF PURSUANT TO 37 C.F.R. §§1.191 AND 1.192

Dear Sir:

This Appeal Brief is being filed in furtherance of the Notice of Appeal filed on June 15, 2005.

1. **REAL PARTY IN INTEREST**

The real party in interest is Pillar Induction Company, LLC, the Assignee of the above-referenced application by virtue of the Assignment to Pillar Induction Company, LLC, recorded on January 26, 2004, recorded at real 014281, frame 0832.

2. **RELATED APPEALS AND INTERFERENCES**

Appellant is unaware of any other appeals or interferences related to this Appeal.

3. **STATUS OF THE CLAIMS**

Claims 1–28 are currently pending. Claims 1-28 are currently under final rejection and, thus, are the subject of this appeal.

4. **STATUS OF AMENDMENTS**

Applicant has not submitted any amendments subsequent to the Final Office Action mailed on March 17, 2005.

5. **SUMMARY OF CLAIMED SUBJECT MATTER**

Claim 1 calls for a crystal growing apparatus (10) having a receptacle (18) and an induction heater (12, 14) is claimed. Specification, ¶[0031]. The receptacle (18) is constructed to receive a material (20) selected to grow a crystal (28) and the induction heater (12, 14) has a Litz coil (92) and is constructed to heat the material (20). Id. The crystal growing apparatus (10) further comprises a housing (36) positioned about the induction heater (12, 14) and constructed to receive the receptacle (18) therein. Specification, ¶[0024].

Another aspect of the present invention is set forth in claim 9 and is directed to an induction heater (12, 14) having a casing (64) with a first end (62) and a second end (66). Specification, ¶[0032]. The casing (64) has a coil (92) of woven strands of wire (98) having a first end and a second end passing therethrough. Id. A lead (44, 46) is connected to an end of the coil of woven strands of wire (98) and has a passage (48) therethrough. Id. The passage (48) is constructed to provide coolant to a space (94) between the coil of woven strands of wire (98) and the casing (64). Specification, ¶[0026]. The induction heater (12, 14) further comprises at least one support leg (32) extending along a coiled portion of the casing (64) and is constructed to retain the casing (64) in a coiled position. Specification, ¶[0024].

As called for in claim 17, the claimed invention includes a method of manufacturing a crystal grower (10) which includes providing a reservoir (18) to receive a crystal growing material (20) therein and coiling a Litz coil (92) to receive the reservoir (18) within a coiled portion of the Litz coil (92). Specification, ¶[0033]. The method further comprises attaching at least one leg (32) to the coiled portion of the Litz coil (92) to maintain a coiled orientation of the coiled portion of the Litz coil (92). Specification, ¶[0024].

According to another aspect of the claimed invention as set forth in claim 21, a method of growing a crystal comprises the steps of placing a crystal growing material (20) in a vessel (18) and energizing a coil of wire (92) that has Litz characteristics that is wound about the vessel (18) and held in a coiled position by a housing (36) formed thereabout. Specification, ¶[0034].

6. **GROUND OF REJECTION:**

In the March 17, 2005 Office Action, the Examiner rejected claims 1-28 under 35 U.S.C. §103(a) as being unpatentable over Haldeman (USP 5,461,215) in view of Von Ammon et al. (USP 6,117,230). Appellant contests the Examiner's only ground of rejection. The claims do not stand or fall together.

7. **ARGUMENT:**

REJECTION UNDER 35 U.S.C. §103(a) BY HALDEMAN IN VIEW OF VON AMMON ET AL.

As discussed in detail below, the Examiner has improperly rejected the pending claims. The Examiner has misapplied long-standing and binding legal precedents and principles in rejecting the claims under §103(a) of Title 35 of the United States Code. Accordingly, Appellant respectfully requests full and favorable consideration by the Board as Appellant believes that claims 1–28 are currently in condition for allowance.

The Examiner finally rejected claims 1–28 under 35 U.S.C. §103(a) as being unpatentable over Haldeman in view of Von Ammon et al. The Examiner contends that the combination of references teaches that which is claimed. Appellant respectfully disagrees.

Appellant believes that a *prima facie* case of obviousness has not been established and one cannot be made based on the art of record. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. MPEP §2143. Second, there must be a reasonable expectation of success, and both the reasonable expectation of success and the teaching or suggestion to make the claimed combination must be found in the prior art, not in applicant's disclosure. Id., citing In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP §2143.

Appellant believes that a *prima facie* case of obviousness cannot be made based on the art of record because, as will be shown below, (1) there is no motivation to combine these references in a way done by the Examiner; (2) the combination would not likely be successful;

and (3) all the elements of the present claims are not present in the references. The Examiner has not established the three basic criteria required under MPEP §2143 to support a §103(a) rejection.

In rejecting claims 1-28 under 35 U.S.C. §103(a) as unpatentable over Haldeman in view of Von Ammon et al., the Examiner stated that:

The Haldeman reference teaches an induction-heating coil in a crystal growth apparatus. The crystal growth apparatus has a means to receive a material for growth, which is to be heated. The heating means is an induction coil, note col. 1 lines 1-20. The induction means is a Litz coil, note col. 3 lines 2-55. The coils are cooled by water, which is allowed to flow through the Litz coil, note and cite supra. The coils are in casings, which has two separate ends. The coils are insulated [sic] for [sic] each other note col. 4. The sole difference between the instant claims and the prior art is the housing means. However, the Ammon et al [sic] reference teaches a czochralski apparatus where there is a housing the [sic] surrounds the heating coils, note, figs. It would have been obvious to one of ordinary skill in the art to modify the Haldeman reference by the teachings of the Ammon et al [sic] reference to include a housing in order to prevent the heater from deforming and creating impurities in the process.

....
[With respect to claims 3, 5-8, 12-15, and 19,] [t]he Haldeman and Ammon et al [sic] references are relied on for the same reasons as stated, supra, and differ from the instant claims in the construction of the coil. However, in the absence of unexpected results, it would have been obvious to one of ordinary skill in the art to determine the optimum, operable means of construction, such as controllers, encasements, tie downs in the Haldeman reference in order to protect the coils during growth and secure the coils so that the coils do not cause vibrations during the growth which would ruin the crystals. (emphasis added.)

....
[With respect to claims 4 and 21-28,] [t]he Haldeman and Ammon [sic] references are relied on for the same reasons as stated, supra, and differ from the instant claims in the method of growth. However, in the absence of unexpected results, it would have been obvious to one of ordinary skill in the art to determine the optimum, operable means of growth which best use the Litz coils in the Haldeman reference in order to decrease energy use in the crystal growing methods. Further, the efficiency of the coils would inherently be similar as there is seen no difference between the Litz coils of the claims and the prior art. (emphasis added.)

March 17, 2005, Final Office Action, pg. 2, ¶3 to pg. 3, ¶3.

Appellant contests several of the assertions the Examiner set forth in rejecting the present claims. The Examiner has added elements to the disclosure of the references, disregarded other portions of the references, and imposed requirements on Appellant which are not supported by the MPEP. As set forth below herein with respect to the individual claims, absent Appellant's disclosure, the combination of Haldeman with Von Ammon et al. does not (1) provide a motivation to combine the references, (2) set forth the requisite reasonable expectation of success

in the combination, and (3) disclose or suggest each and every element as called for in the present claims.

CLAIM 1:

Claim 1 calls for, in part, a crystal growing apparatus having a receptacle constructed to receive a material selected to grow a crystal and an induction heater having a Litz coil and being constructed to heat the material selected to grow a crystal. Claim 1 further calls for a housing positioned about the induction heater wherein the housing is constructed to receive the receptacle therein. The Examiner maintained that claim 1 is unpatentable over Haldeman in view of Von Ammon et al. under §103(a) because “[t]he Haldeman reference teaches an induction-heating coil in a crystal growth apparatus.” March 17, 2005, Final Office Action, pg. 2, ¶3. Haldeman merely states that induction heaters have been applied in the crystal growth industry. See Haldeman, col. 1, lns. 11-14. The Examiner further maintained that Haldeman teaches “[t]he crystal growth apparatus has a means to receive a material for growth, which is to be heated” and that “[t]he sole difference between the instant claims and the prior art is the housing means.” March 17, 2005, Final Office Action, pg. 2, ¶3. With respect to the distinction, the Examiner maintains that “the Ammon et al [sic] reference teaches a czochralski apparatus where there is a housing the [sic] surrounds the heating coils, note, figs.” and that “[i]t would have been obvious to one of ordinary skill in the art to modify the Haldeman reference by the teachings of the Ammon et al [sic] reference to include a housing in order to prevent the heater from deforming and creating impurities in the process.” March 17, 2005, Final Office Action, pg. 2, ¶3. Appellant respectfully disagrees.

It is well settled that the burden of establishing a *prima facie* case of obviousness falls on the Examiner. MPEP §2142. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes each and every element of the claimed invention, but also provide “a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). That is, “[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art.” MPEP §2143.01. The “[f]act that references can be combined or

modified is not sufficient to establish prima facie obviousness.” Id. When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

MPEP §2141.02 states that “[a]scertaining the differences between the prior art and the claims at issue requires interpreting the claim language, and considering both the invention and the prior art references as a whole.” MPEP §2141.02. MPEP §2142.02 further states that “[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” MPEP §2141.02, citing W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984), (emphasis added). That is, an Examiner cannot simply disregard portions of the references which lead away from the claimed invention.

Haldeman discloses a Litz coil induction heater. Haldeman, Abstract. Haldeman states that “[t]he present invention represents an improvement ... since the ... resulting coil is flexible enough to permit its use for different induction heating applications by merely re-orienting the turns without completely re-constructing the coil for each new work piece.” Haldeman, col. 3, lns. 58-64. The Haldeman induction heater is not restrained or housed and thereby allows the coil to be re-orientated. Haldeman further states that “the step of plastic encapsulation is also not necessary.” Haldeman, col. 3, lns. 64-65. That is, the tubing of the induction heater is rigid enough to support the Litz coil and maintain a shape, yet flexible enough to allow re-orientation of the turns of the induction heater to satisfy a plurality of heating orientations. Haldeman continues that the construction of the induction heater “provides a nominal turn radius which can be deformed elastically to provide a long stretched out solenoid or a short multi-turn coil.” Haldeman, col. 4, ln. 66 to col. 5, ln. 2. Accordingly, Haldeman teaches an induction heater that is deformable, or non-contained or non-restrained, to allow re-orientation of the turns of the induction heater to satisfy a plurality of heating orientations.

Haldeman states that “induction heating is ideally suited for material-processing technology and has been used for many years for melting, brazing, heat treating and crystal growth.” Haldeman, col. 1, lns. 10-14. Haldeman further states that “the main reason to prefer induction heating is cleanliness” and that “the heating coils can be located outside the physical enclosure.” Haldeman, col. 1, lns. 14-17. Haldeman discloses that the induction heater is isolated from the melt by an enclosure formed between the heater and the crystalline material

about the crystal growing apparatus. That is, an enclosure isolates the heater from the growth material and as such, encapsulation of the heater is not necessary or desired. See Haldeman, col. 3, lns. 64-65. Haldeman teaches that, by positioning the induction heater outside an enclosure of the crystal growing apparatus, the induction heater is not housed and such a construction allows the induction heater to be quickly and conveniently re-orientated to other heating configurations. Positioning a housing about the induction heater of Haldeman, as called for in claim 1, renders the coils of the induction heater incapable of such re-orientation. That is, Haldeman, in stating that the coils are constructed to be re-oriented and that encapsulation of the coil is not necessary, teaches away from a housing positioned about the induction heater as called for in claim 1.

The Examiner's assertion that "it would have been obvious to one of ordinary skill in the art to modify the Haldeman reference by the teachings of the Ammon et al [sic] reference to include a housing in order to prevent the heater from deforming and creating impurities in the process" is not supported by the disclosure of Haldeman. See March 17, 2005, Final Office Action, pg. 2, ¶3. That is, this motivation to combine ignores what Haldeman teaches -- that (1) a housing is positioned between the melt and the heater which isolates the melt from the heater and (2) one of the improvements of the induction heater of Haldeman is that it can be elastically deformed to a plurality of configurations. The combination of Haldeman with Von Ammon et al. is contrary to the express teaching of Haldeman and cannot be sustained under MPEP §2145.II.X.D.2 which states that "[i]t is improper to combine references where the references teach away from their combination." MPEP §2145.II.X.D.2.

MPEP §2142.02 states that "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." MPEP §2141.02, citing W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). As cited above, Haldeman teaches away from positioning a housing about the induction heater as called for in claim 1. The Examiner's assertion that it would be obvious to combine the Litz coil induction heater of Haldeman with the crystal growth apparatus of Von Ammon et al. indicates that the Examiner has disregarded the disclosure of Haldeman which teaches away from positioning a housing about the induction heater. The Examiner attempted to modify the reference in a way that contravenes the reference's own purpose and intent.

The Examiner further maintained that "there is no teaching in the Haldeman reference which states do not use a housing means" and that the heater of the Haldeman reference is made flexible so as to surround different objects including crucibles." March 17, 2005, Final Office Action, pg. 3, ¶5 to pg. 4, ln. 1. The Examiner further maintains that "the use of a housing to

surround the heater and the crucible being heated does not ruin the heater of the reference.” Id., pg. 4, Ins. 1-2. The Examiner’s assertion indicates the Examiner’s disregard of the “as a whole” requirement of MPEP §2141.02. That is, a person of ordinary skill in the art would readily appreciate that positioning a housing about the induction heater of Haldeman would fix the relative position of the coils of the induction heater disclosed therein, and render the heater, disclosed as usable in a plurality of orientations, unsuitable for its intended purpose, i.e. a flexible, repositionable induction heater. Furthermore, Haldeman discloses that the housing is positioned between the crystal grower and the induction heater. Haldeman states that “... the heating coil can be located outside the physical enclosure.” Haldeman, col. 1, Ins. 16-17. Haldeman teaches that (1) the heating coil is reformable and (2) that the heating coil is positioned outside the physical enclosure. That is, Haldeman teaches positioning of the housing at a location other than about the induction heater thereby allowing the induction heater to be deformed to a plurality of shapes. Such disclosure clearly teaches away from the heater having a housing suggested by the Examiner. As such, the combination of the induction heater of the Haldeman with the crystal growth apparatus of Von Ammon et al., or any housing of the induction heater, is contrary to the express teaching of Haldeman and is insufficient to support a 35 U.S.C. §103(a) obviousness rejection.

Even assuming arguendo that Haldeman and Von Ammon et al. are combinable, the combination of the Litz coil equipped induction heater of Haldeman with the crystal growth apparatus of Von Ammon et al. would result in an assembly which disregards objects of both of Haldeman and Von Ammon et al. That is, not only does the combination eviscerate that which is taught by the references, the combination lacks a likelihood of success.

MPEP §2143.01 states that “If [a] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. MPEP §2143.01, citing In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Von Ammon et al. discloses a crystal growth apparatus, wherein the crystal material is heated by a bottom heater. Von Ammon et al. states that “[i]t is an object of the present invention to reduce the time taken to melt silicon in a quartz-glass crucible, while protecting the crucible from overheating and while stabilizing the melt.” Von Ammon et al., col. 1, Ins. 51-54. Von Ammon et al. further states that “this object [is achieved] by providing ... energy to the silicon melt at least some of the time inductively using a coiled heater arranged under the crucible.” Von Ammon et al., col. 1, Ins. 55-61. Claim 1 calls for, in part, a housing positioned about the induction heater and constructed to receive the receptacle therein. Not only does Haldeman teach away from positioning a housing about the induction heater thereof, Von

Ammon et al. does not teach a housing that is both positioned about the induction heater and constructed to receive the induction heater therein.

The Examiner further maintained that “[o]ne would not simply rearrange the heater of the Haldeman reference based merely on the figure of the Von Ammon [sic] reference but would use the heater configuration shown in Haldeman.” March 17, 2005, Final Office Action, pg. 4, ¶3. Such an assertion clearly disregards the teaching of Von Ammon et al. wherein the object of the invention is to heat the crystal material with a bottom heater. That is, the only reasonable combination of Haldeman and Von Ammon et al. requires the heater of Haldeman to be positioned below the crucible as shown in the Figures of Von Ammon et al. Additionally, tube 19 of Von Ammon et al., which the Examiner has interpreted as the housing called for in the present claims, is disposed below the crucible. Von Ammon et al. states that “a heater according to the invention, [is] referred to hereafter as a bottom heater...” Von Ammon et al., col. 2, lns. 21-22. That is, the “invention” of Von Ammon et al. is a resistive/inductive heater disposed beneath the reservoir of the apparatus. Simply, the Examiner’s combination of the heater configuration of Haldeman with the crystal grower of Von Ammon et al., disregards the express disclosure of Von Ammon et al. that the “invention” is a bottom heater. The Examiner’s interpretation further disregards that the heater of such a combination does not have a housing positioned about the induction heater. The only “housing” of Von Ammon et al. is positioned below the reservoir, as has the heater disposed therein. Even combining the heater of Haldeman with the crystal grower of Von Ammon et al. does not result in the apparatus as claimed. Claim 1 calls for a housing positioned about the induction heater and constructed to receive the receptacle therein. A crystal growing apparatus having such a housing is not shown, suggested, or taught by the art of record.

Accordingly, at least for the reasons set forth above, not only does the art of the record fail to provide the requisite motivation or suggestion for the Examiner’s combination, but the combination lacks any expectation of success from such a combination. Furthermore, the suggested combination renders the assemblies of Haldeman and Von Ammon et al. unsuitable for their respective intended purposes. For all the reasons set forth above, Appellant believes claim 1 is patentably distinct from the Haldeman in view of Von Ammon et al. Appellant believes claims 2-8 are in condition for allowance at least pursuant to the chain of dependency. However, since claims 6 and 7 include subject matter that is additionally distinguishable from the art of record, Appellant will specifically address those features that are additionally patentably distinct.

Claim 6:

Claim 6 depends from claim 5 which depends from claim 1. Claim 6 calls for, in part, the housing being positioned about a hose and further comprises at least one leg constructed to be attached to the hose, the leg having an end which extends past an end of the housing. There is no comparable structure taught, shown, or suggested in the art of record. In fact, Haldeman, in teaching that the induction heater thereof is constructed to be re-orientated, teaches away from any such structure wherein the housing is attached to the hose of the induction heater. See Haldeman, col. 4, ln. 66 to col. 5, ln. 2. Furthermore, the induction heater of Von Ammon et al. includes a coil which is “preferably made of graphite,” Von Ammon et al., col. 3, lns. 33-34. That is, the induction heater of Von Ammon et al. is a comparatively rigid material which maintains its manufactured shape. The Examiner maintains that “in the absence of unexpected results, it would have been obvious to one of ordinary skill in the art to determine the optimum, operable means of construction, such as controllers, encasements, tie downs in the Haldeman reference....” March 17, 2005, Final Office Action, pg. 3, lns. 3-5. Appellant has no such burden.

To support a *prima facie* obviousness rejection, it is the Examiner’s burden to establish that the reference, or references when combined, teach or suggest each or every element called for in the claims. Haldeman teaches an induction heater that is deformable to various orientations. That is, not only does Haldeman not teach, suggest nor disclose a leg attached to the hose of the induction coil, Haldeman teaches away from at least one leg attached to the hose as called for in claim 6. As such, that which is called for in claim 6 is not taught, shown, or disclosed in the art of record. Accordingly, Appellant believes claim 6 is patentably distinct thereover.

Claim 7:

Claim 7 depends from claim 6 and further calls for at least one cable tie mount passing through the at least one leg and connected to the hose. As the art of record fails to teach or suggest at least one leg as called for in claim 6, the art of record also fails to teach, suggest, or disclose one cable tie mount passing through the at least leg and connected to the hose as called for claim 7. Again, it is the Examiner’s burden to support a §103(a) rejection and to articulate where in the art of record that which is called for in the claims is shown or suggested. As evidenced by the Examiner’s failure to address that which is called for in claim 7 other than to require “unexpected results”, the art of record does not teach or suggest that which is called for in claim 7. Accordingly, Appellant believes that which is called for in claim 7 is patentably distinct thereover.

CLAIM 9:

Claim 9 calls for, in part, an induction heater having at least one support leg extending along a coiled portion of a casing and constructed to retain the casing in a coiled position. As previously presented with respect to claim 1, Haldeman teaches an induction heater “which can be deformed elastically to provide a long stretched out solenoid or a short multi-turn coil.” Haldeman, col. 4 ln. 67 to col. 5, ln. 2. That is, the induction heater of Haldeman does not (1) include at least one support leg which extends along a coiled portion of the casing and (2) include at least one support leg constructed to retain the casing in a coiled position. Not only does Haldeman fail to provide the requisite motivation to be combined with a reference which may include leg elements constructed to retain a coiled position of the coils of the induction heater, combining Haldeman with such a reference renders Haldeman unsuitable for its intended purpose of providing a multi-positional induction heater.

Von Ammon et al. discloses an induction heater having a plurality of support elements which secure the induction heater to a thermally insulated base plate. Von Ammon et al. states that “it is preferable for each of the turns of the coil to be fixed mechanically to the base plate at at least three support points.” Von Ammon et al., col. 3, lns. 45-47. As shown in Fig. 2 of Von Ammon et al., support element 10 has a first end which engages turn 6 of the induction heater and a second end which is received in a socket 11 of base plate 9. That is, the supports must extend from the turns of the induction heater in order to engage the base plate which is generally parallel to the induction heater. The support elements of Von Ammon et al. do not extend along the coiled portion of the induction heater but must extend therefrom and engage base plate 9 to maintain the position of the induction heater. This is not what is called for in claim 9. Claim 9 calls for the at least one support leg to extend along the coiled portion of the casing and constructed to retain the casing in the coiled position. That is, the support leg extends along the coiled portion and the extension of the support leg along the coiled portion retains the coiled orientation of the casing. The support element of Von Ammon et al. extends generally perpendicular to a direction along the coiled portion of the induction heater and does not retain the coiled position of the induction heater. The base plate maintains the position of the induction heater only when the support element is engaged therewith. That is, without the base plate, the support elements merely extend from the induction heater and do not secure the induction heater.

Accordingly, at least for the reasons set forth above, not only does the art of the record fail to provide the requisite motivation or suggestion for the Examiner’s combination, but the combination lacks any expectation of success from such a combination. Additionally, any combination of Haldeman with Von Ammon et al. does not include each and every element called

for in claim 9. For all the reasons set forth above, Appellant believes claim 9 is patentably distinct over Haldeman in view of Von Ammon et al. Appellant believes claims 10-16 are in condition for allowance at least pursuant to the chain of dependency. However, since claims 12, 13, and 14 include subject matter that is additionally distinguishable from the art of record, Appellant will specifically address those features that are additionally patentably distinct.

Claim 12:

Claim 12 calls for, in part, an induction heater having at least one cable tie passing through a support leg and engaged with at least a portion of the casing wherein the at least one cable tie maintains a spacing between adjacent windings of the coil of woven strands of wire. As previously argued with respect to claim 9, the art of record fails to teach or suggest at least one support leg as called for in claim 12. Additionally, as argued above with respect to claim 7, the art of record fails to teach, suggest, or disclose an induction heater assembly having at least one cable tie. If the support element of Von Ammon et al. is interpreted as a support leg as called for in claim 9, as shown in Fig. 2 of Von Ammon et al., there is no element that “passes through” the support leg as called for in claim 12. As such, that which is called for in claim 12 is not shown, disclosed, or suggested in the art of record. Accordingly, Appellant believes that which is called for in claim 12 is patentably distinct over the art of record.

Claim 13:

Claim 13 calls for, in part, an induction heater having a housing having an opening therethrough and extending about the casing and a portion of at least one support leg. That is, the housing does not merely extend about the induction coil but extends about the casing of the induction heater. As argued above with respect to claim 1, Haldeman, in teaching a deformable induction heater, teaches away from positioning a housing about an induction heater. What the Examiner has characterized as the “housing” of the assembly of Von Ammon et al., Von Ammon et al. discloses as a tube. As shown in Fig. 5 of Von Ammon et al., tube 19 is positioned about the periphery of the bottom heater induction heater 4. The casing of claim 13 includes a coiled portion and has a coil of woven strands of wire passing therethrough. That is, the casing runs the length of the induction heater. A cross-section of the induction heater includes a portion of the casing. Claim 13 calls for the housing to extend about or around the casing. As shown in Fig. 5 of Von Ammon et al., tube 19 is adjacent to the induction heater. The tube is not positioned about the casing in that the housing does not extend between adjacent coils of the induction heater. Simply, although the tube is adjacent heater 4, it is not positioned about the individual coils, as called for in claim 13.

Accordingly, for the reasons set forth above, Appellant believes that which is called for in claim 13 is also patentably distinct over the art of record.

Claim 14:

Claim 14, which depends from claim 13, calls for a fitting constructed to secure an end of the casing to the housing. There is no comparable feature disclosed in the art of record. Haldeman disclosed an induction heater having a Litz coil. Haldeman teaches away from positioning the induction heater disclosed therein in a housing as called for in the present claims. Von Ammon et al. discloses a tube (19) forming an end of the induction heater. That is, the induction heater includes an end portion which includes a base plate (9) and is electrically connected to a controller via a slip ring (21b). With respect to Fig. 5, Von Ammon et al. states that “axial movements of the crucible and of the bottom heater are brought about by a specially designed shaft 18....” Von Ammon et al., col. 4, lns. 34-36. Von Ammon et al. further states that “[t]he shaft 18 is divided into two coaxial parts 18a and 18b, with the inner part 18a being designed as an inner electrical connection of the bottom heater” and that “[t]ogether with base plate 9 and a tube 19, the outer part 18b serves as an outer electrical connection for the bottom heater and at the same time supports the base plate 9.” Id., lns. 36-42. The “housing”, or tube 9, is a portion of the induction heater and electrically connects the induction heater to an electrical source. In Von Ammon et al., there is no casing nor is there a fitting constructed to secure an end of a casing to a housing as called for in claim 14. Although Haldeman teaches an induction heater having a casing, Haldeman teaches away from connecting the induction heater to a housing, let alone a fitting constructed to secure an end of the casing to a housing. That which is called for in claim 14 is not taught or suggested in the art of record. Accordingly, Appellant believes that which is called for in claim 14 is patentably distinct thereover.

CLAIM 17:

Claim 17 calls for a method of manufacturing a crystal grower comprising, in part, coiling a Litz coil to receive a reservoir within a coiled portion of the Litz coil and attaching at least one leg to the coiled portion of the Litz coil to maintain a coiled orientation of the coiled portion of the Litz coil. As previously argued with respect to claim 9, Haldeman teaches away from retaining a coiled orientation of the induction heater disclosed therein. Haldeman teaches that the induction heater disclosed therein is deformable to allow heating of a plurality of differently sized and shaped objects. Additionally, once deformed, the tubing of the induction heater disclosed in Haldeman momentarily maintains the shape of the induction heater. That is, there is no motivation to attach a leg to the coiled portion of the induction heater to maintain a coiled orientation of the coiled portion if the induction heater is to be oriented in a plurality of

positions and if the material of the induction heater, i.e. the tubing, is rigid enough to support and maintain a repositioned orientation of the induction heater.

The Examiner maintains that “[i]t would have been obvious ... to modify the Haldeman reference by the teachings of the Ammon et al [sic] reference to include a housing in order to prevent the heater from deforming and creating impurities in the process.” March 17, 2005 Final Office Action, pg. 2, ¶3. Von Ammon et al. discloses an induction heating element that is “preferably made of graphite, CFC (carbon fiber composite) or metals such as molybdenum or tantalum.” Von Ammon et al., col. 3, lns. 35-36. That is, much like a heating element on a range of a stove, the coiled configuration of the heating element is maintained by the material properties of the material from which the heating element is constructed. When a heating element from an oven range is removed from the range, the heating element does not unwind. The material from which the element is manufactured is sufficiently rigid to maintain the coiled orientation of the heating element. Although Von Ammon et al. discloses that “the support elements ... hold the turns of the coil at a constant distance from one another and damp possible vibrations of the turns”, this is not what is called for in claim 17. See Von Ammon et al., col. 3, lns. 50-52. Von Ammon et al. further states that “[i]t is preferable for each of the turns of the coil to be fixed mechanically to the base plate at at least three support points.” Von Ammon et al., col. 3, lns. 45-47. That is, one of the supports cannot maintain a coiled orientation of the coiled portion of the induction heater of Von Ammon et al. Minimally, Von Ammon et al. discloses three supports to support one coil and three additional supports for each subsequent coil. Von Ammon et al. discloses that the supports define the spacing between adjacent coils. Further, a person of ordinary skill in the art would readily appreciate that the solid graphite induction heater of the Von Ammon et al. maintains the coiled orientation of the coil portion and not the supports connected thereto as called for in claim 17.

As such, not only does the art of record fail to provide the requisite motivation to combine the references in the manner done by the Examiner, but the combination fails to teach, suggest, or disclose each and every element as called for in claim 17. Claim 17 calls for, in part, attaching at least one leg to the coiled portion of a Litz coil to maintain a coiled orientation of the coiled portion of the Litz coil. Such a construction is not taught, suggested, or disclosed in the art of record. Accordingly, Appellant believes that which is called for in claim 17 is patentably distinct over the art of record. Appellant further believes claims 18-20 are in condition for allowance at least pursuant to the chain of dependency.

CLAIM 21:

Claim 21 calls for a method of growing a crystal which includes, in part, energizing a coil of wire that has Litz characteristics and that is wound about a vessel and held in a coiled position by a housing formed thereabout. As argued hereinabove with respect to claims 9 and 17, Haldeman discloses a Litz coil induction heater which is constructed to be re-oriented. Von Ammon et al. discloses a crystal growing apparatus wherein the orientation of the induction heater is determined by curvature of the solid graphite heater employed therein. Furthermore, Von Ammon et al. discloses that the object of the invention is to provide efficient and uniform heating of the crystalline material by positioning the induction heater below the crystalline reservoir or by providing a “bottom heater”. *See Von Ammon et al., col. 1, lns. 50-61.*

Claim 21 calls for a coil of wire that is wound about a vessel and held in a coiled position by a housing formed thereabout. As argued above with respect to respect to claim 17, Haldeman fails to disclose positioning any housing about the induction heater thereof. In fact, in disclosing that the induction heater is deformable to allow heating of a plurality of parts having a different shapes and sizes, Haldeman teaches away from any extraneous retention of the induction heater. Furthermore, it is the material and not any “housing”, or tube 19 of Von Ammon et al. which maintains the heater disclosed therein in a coiled position. This is not what is called for in claim 21. Claim 21 calls for a housing formed about a coil of wire which holds the coil of wire in a coiled position. Such a construction is not taught, shown, disclosed, or suggested in the art of record. Accordingly, Appellant believes that which is called for in claim 21 is patentably distinct over Haldeman in view of Von Ammon et al. Additionally, Appellant believes claims 22-28 are in condition for allowance at least pursuant to the chain of dependency.

8. CONCLUSION

In view of the above remarks, Appellant respectfully submits that the Examiner has provided no supportable position or evidence that claims 1-28 are not patentable. The art of record does not support the combination of references asserted by the Examiner. As argued above, the combination of Haldeman in view of Von Ammon et al. (1) does not provide the requisite motivation or suggestion to combine the references in the manner done by the Examiner, (2) lacks a reasonable likelihood of success for any resultant combination thereof, and (3) fails to teach or suggest each and every element as called for in the present claims. Accordingly, Appellant believes claims 1-28 are patentably distinct thereover. Accordingly, Appellant respectfully requests that the Board find claims 1-28 patentable over the prior art of record, direct withdrawal of all outstanding rejections and direct the present application be passed to issuance.

General Authorization for Extension of Time

In accordance with 37 C.F.R. §1.136, Appellant hereby provides a general authorization to treat this and any future reply requiring an extension of time as incorporating a request therefore. A Credit Card Authorization is included for the \$500.00 fee for filing this Appeal Brief under 37 C.F.R. §1.17(c).

Respectfully submitted,

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CLAIMS APPENDIX

1. (Previously Presented) A crystal growing apparatus comprising:
a receptacle constructed to receive a material selected to grow a crystal;
an induction heater having a Litz coil and constructed to heat the material; and
a housing positioned about the induction heater and constructed to receive the receptacle therein.
2. (Original) The crystal growing apparatus of claim 1 further comprising a water passage extending through the induction heater and constructed to allow a water flow therethrough to cool the Litz coil.
3. (Original) The crystal growing apparatus of claim 1 further comprising a controller electrically connected to a pair of ends of the Litz coil and constructed to pass an electrical signal therethrough.
4. (Original) The crystal growing apparatus of claim 1 further comprising a rod constructed to initiate a pull of a crystal from the material.
5. (Original) The crystal growing apparatus of claim 1 wherein the induction heater further comprises a hose constructed to receive the Litz coil therein.
6. (Previously Presented) The crystal growing apparatus of claim 5 wherein the housing is positioned about the hose and further comprises at least one leg constructed to be attached to the hose, the leg having an end which extends past an end of the housing.
7. (Original) The crystal growing apparatus of claim 6 further comprising at least one cable tie mount passing through the at least one leg and connected to the hose.
8. (Original) The crystal growing apparatus of claim 1 wherein the reservoir is constructed of a material that is responsive to induction heating.
9. (Previously Presented) An induction heater comprising:
a casing having a first end and a second end;

a coil of woven strands of wire having a first end and a second end and passing through the casing;

a lead connected to an end of the coil of woven strands of wire and having a passage therethrough, the passage constructed to provide coolant to a space between the coil of woven strands of wire and the casing; and

at least one support leg extending along a coiled portion of the casing and constructed to retain the casing in a coiled position.

10. (Original) The induction heater of claim 9 wherein the individual wires of the coil of woven strands of wire are electrically isolated from one another along a length of the individual wires.

11. (Original) The induction heater of claim 9 wherein the coil of woven strands of wire is a Litz coil.

12. (Previously Presented) The induction heater of claim 9 further comprising at least one cable tie passing through the support leg and engaged with at least a portion of the casing wherein the at least one cable tie maintains a spacing between an adjacent winding of the coil of woven strands of wire.

13. (Previously Presented) The induction heater of claim 9 further comprising a housing having an opening therethrough and extending about the casing and a portion of the at least one support leg.

14. (Original) The induction heater of claim 13 further comprising a fitting constructed to secure an end of the casing to the housing.

15. (Original) The induction heater of claim 9 further comprising a first and a second connector, each connector constructed to electrically connect a respective end of the coil of woven strands of wire to a power source.

16. (Original) The induction heater of claim 9 incorporated into a crystal growing device and constructed to heat a crystal growing material.

17. (Previously Presented) A method of manufacturing a crystal grower comprising:
providing a reservoir to receive a crystal growing material therein; and
coiling a Litz coil to receive the reservoir within a coiled portion of the Litz coil;
and
attaching at least one leg to the coiled portion of the Litz coil to maintain a coiled orientation of the coiled portion of the Litz coil.
18. (Original) The method of claim 17 further comprising energizing the coil of wire to heat the crystal growing material in the reservoir.
19. (Original) The method of claim 17 wherein providing a reservoir includes forming a reservoir of a material resistant to induction heating.
20. (Original) The method of claim 17 further comprising preventing atmospheric contamination of the crystal growing material by enclosing the reservoir.
21. (Previously Presented) A method of growing a crystal comprising the steps of:
placing a crystal growing material in a vessel; and
energizing a coil of wire that has Litz characteristics and that is wound about the vessel and held in a coiled position by a housing formed thereabout.
22. (Original) The method of claim 21 further comprising circulating coolant about the coil of wire to cool the coil of wire.
23. (Original) The method of claim 21 further comprising pulling a crystal fiber from the crystal growing material in the vessel.
24. (Original) The method of claim 21 further comprising achieving a heating efficiency of at least 75%.
25. (Original) The method of claim 21 wherein the step of energizing includes no more than a 25% energy loss by the coil of wire.

26. (Original) The method of claim 25 wherein the step of energizing includes no more than an 18% energy loss by the coil of wire.

27. (Original) The method of claim 21 wherein the step of energizing results in induction heating of the vessel.

28. (Original) The method of claim 21 wherein the step of energizing results in induction heating of the crystal growing material.

EVIDENCE APPENDIX:

-- None --

RELATED PROCEEDINGS APPENDIX:

-- None --